What is claimed is:

1. A catheter for treatment of arrhythmia; comprising a catheter shaft having a double-cylinder structure in which an inner shaft is slidably inserted into an outer shaft, a balloon attached between the tip portion of the inner shaft and the tip portion of the outer shaft in a straddling state, a pair of high frequency current-carrying electrodes of which at least one electrode is disposed inside the balloon, and a temperature sensor for monitoring the temperature inside the balloon; wherein the catheter is configured such that in the deflated state of the balloon, at least the front edge of the balloon protrudes ahead of the tip portion of the inner shaft towards the front thereof.

2. A catheter for the treatment of arrhythmia; comprising a catheter shaft having a double-cylinder structure in which an inner shaft is slidably inserted into an outer shaft, a balloon attached between the tip portion of the inner shaft and the tip portion of the outer shaft in a straddling state, a pair of high frequency current-carrying electrodes of which at least one electrode is disposed inside the balloon, and a temperature sensor monitoring the temperature inside the balloon; wherein the catheter is configured such that a tube that is softer than the inner shaft is provided at the tip portion of the inner shaft.

3. The catheter for the treatment of arrhythmia of claim 2, further characterized in that at least one side-hole is provided in the tube.

4. The catheter for the treatment of arrhythmia of claim 2 or 3, further integrally molded such that the tube has a hardness gradient with respect to the inner shaft.

5. The catheter for the treatment of arrhythmia of any of claims 1 to 4, further characterized by including a polyurethane copolymer material in

which an instantaneous recovery rate at the modulus of 300% elongation is 90% or greater and its strength is between 12 and 24 MPa.

6. The catheter for the treatment of arrhythmia of any of claims 1 to 5; further characterized in that the balloon comprises a membrane with thickness between 100 to 300 μm, its shape in the inflated state is a conical gradually increasing in diameter towards a large diameter portion at the rear thereof from a small diameter portion at the tip, its length La in the axial direction is between 10 and 40 mm, and the ratio Da/Db of a large diameter Da and a small diameter Db is within the range of 5 to 12.

7. The catheter for the treatment of arrhythmia of any of claims 1 to 5; further characterized in that the balloon comprises a membrane with thickness between 100 to 300 μm, has a cylindrical shape in the inflated state, has an axial direction length Lb of between 10 and 40 mm, has a diameter Dc of between 5 and 20 mm, and has the ratio (Lb/Dc) of the length Lb and the diameter Dc within the range of 1.5 to 8.0.

8. The catheter for the treatment of arrhythmia of claim 7, further characterized in that the cylinder of the balloon becomes a curved shape in the inflated state.

9. The catheter for the treatment of arrhythmia of any of claims 1 to 8, further characterized by providing the temperature sensor fixed in the high frequency current-carrying electrode disposed within the balloon.

10. The catheter for the treatment of arrhythmia of any of claims 1 to 9; further characterized in that the high frequency current-carrying electrode disposed within the balloon is formed by the wrapping in a spiral configuration of flat metal wire with a flat cross-section shape maintaining a planar orientation about the outer surface of the inner shaft.

11. The catheter for the treatment of arrhythmia of any of claims 1 to

10; further characterized in that the high frequency current-carrying electrode disposed within the balloon is formed by the coating of conductive material on at least the half of the inner circumferential surface of the balloon in the tip side thereof.

12. The catheter for the treatment of arrhythmia of claim 11, further characterized in that the planar conductive material is formed by vapor deposition, plating, or painting.

13. The catheter for the treatment of arrhythmia of any of claims 1 to 12; further characterized in that the inner shaft, the outer shaft, and the coating materials of the lead wires of the high frequency current-carrying electrodes, and of the lead wires of the temperature sensor, are made of material having a specific inductive capacity of 3 or less at a frequency of 1 MHz respectively.

14. The catheter for the treatment of arrhythmia of any of claims 1 to 13; further characterized in that a pipe having radiation shielding properties is connected to the tips of the inner shaft and the outer shaft respectively, and that the balloon is straddled between the radiation shielding pipes.

15. The catheter for the treatment of arrhythmia of any of claims 1 to 14; further characterized by providing at the rear end of the catheter shaft a scale indicating the diameter of the balloon corresponding to the degree of relatively sliding quantity between the inner shaft and the outer shaft.

16. The catheter for the treatment of arrhythmia of any of claims 1 to 15, further characterized by disposing the temperature sensor nearer the tip of the balloon than the center of the axial length in the inflated state.

17. The catheter for the treatment of arrhythmia of any of claims 1 to 16, further characterized by providing potential detection electrodes for detecting the potential of one or both ablation areas straddling the balloon at

the tip of the catheter shaft.

18. The catheter for the treatment of arrhythmia of claim 17; further characterized in that the lead wires of the potential detection electrodes are coated by an electrically-insulating material, and extend to the rear end of the catheter shaft through any one of the clearance between the inner shaft and the outer shaft, the material thickness of the inner shaft and the material thickness of the outer shaft.

19. The catheter for the treatment of arrhythmia of any of claims 1 to 18; further characterized by disposing anti-elongation string in parallel with the axial direction of the outer shaft, securing the tip of the anti-elongation string to the tip of the outer shaft, and securing the rear end of the anti-elongation string to an operation section provided at the rear end of the outer shaft.

20. The catheter for the treatment of arrhythmia of claim 19, further characterized in that the anti-elongation string comprises a line body made of at least one of polyimide fiber, polyester fiber, polyethylene fiber, carbon fiber, and aramid fiber.

21. The catheter for the treatment of arrhythmia of any of claims 1 to 20, further characterized by providing an internal pressure adjustment means for the balloon in the operation section provided at the rear end of the catheter shaft.

22. The catheter for the treatment of arrhythmia of any of claims 1 to 21, further characterized by supplying high frequency power of the 1 to 2,450 MHz frequency range to the pair of high frequency current-carrying electrodes.

23. The catheter for the treatment of arrhythmia of any of claims 1 to 22; further characterized by forming into a plane the high frequency

current-carrying electrode to be attached to the body of the patient as a counter electrode of the high frequency current-carrying electrode inside the balloon and providing at least one of those, and in that the planar electrode has a surface area of between 80 and 600 cm^2.

24. The catheter for the treatment of arrhythmia of any of claims 1 to 19; further characterized by disposing both electrodes of the pair of high frequency current-carrying electrodes within the balloon, by mutually electrically insulating the lead wires connected to each of the electrodes, and by adopting a coaxial cable construction for this purpose.

25. The catheter for the treatment of arrhythmia of any of claims 1 to 24, further characterized by providing a flexible part of low rigidity in the vicinity of the tip of the catheter shaft whereto the balloon is attached.

26. A guide wire for a catheter for the treatment of arrhythmia; connecting a operation section and a flexible section in series by metal wire, comprising a taper section of the flexible section having a diameter gradually decreasing from the metal wires on the operation section and a small diameter section of the flexible section connected to the taper section; wherein the operation section is coated with fluororesin or silicone; and the flexible section is coated with a resin having a specific inductive capacity of 3 or less at a frequency of 1 MHz.

27. The guide wire of claim 26, further characterized in that the entirety of the operation section is coated with a resin with a specific inductive capacity of 3 or less at a frequency of 1 MHz.

28. The guide wire of claim 26 or 27, further characterized in that the surface of the resin has one of a hydrophilic coating, and an antithrombogenic coating.

29. A stylet used for the catheter for the treatment of arrhythmia of

claim 25; characterized in that a core wire is entirely formed of metal wire with shape memory and radiation shielding properties, wherein the tip of the core wire is coated by one or both of a coil and a braided section comprising metal wire with radiation shielding properties, and formed into a preliminarily deformed portion having a curved shape capable of extension to a straight-line shape and elastic return to the curved shape.

30 The stylet of claim 29, further characterized in that the core wire is made of stainless steel.

31. The stylet of claim 29 or 30, further characterized by providing a stopper regulating the length of insertion of the catheter, and a handle rotating the core wire about an axis thereof.

32. The catheter for the treatment of arrhythmia of claim 25; further characterized in that the flexible part bends as a result of the insertion into the inner shaft of the stylet of any of claims 29 to 31, and that the balloon side of the flexible part is capable of deflection at an angle of between 40° and 140° with respect to the axial direction of the catheter shaft.

33. The catheter for the treatment of arrhythmia of claim 32; characterized in that the clearance between the stylet and the inner shaft is formed so as to facilitate suction and charging of liquid with a viscosity of 5 mPas or less via the tip of the catheter at a rate of between 5 and 15 ml/minute.